

REMARKS

Reconsideration of the application is respectfully requested for the following reasons:

1. Formalities

The claims and specification have been revised to place the application in proper U.S. format and to correct various minor grammatical and idiomatic errors. Because the changes are all formal in nature, it is respectfully submitted that the changes do not involve new matter.

2. Rejections of Claims 1 and 3-6 Under 35 USC §102(b), and Claim 2 Under 35 USC §103(a), in view of U.S. Patent No. 4,628,530 (Op De Beek)

These rejections are respectfully traversed on the grounds that the Op De Beek patent fails to disclose or suggest a process for automatically performing a frequency response equalization tuning in which:

- a CPU performs frequency response matching with respect to a predetermined ideal frequency response value on an audio signal from a speaker;
- calculates a set of equalization tuning gains corresponding to a frequency response compensation performed in the speaker; and
- sends the calculated gains to a digital equalizer for storage,
- thereby enabling the digital equalizer to automatically perform frequency response equalization tuning on the speaker and maintain the output audio sound in an optimum frequency response state.

Instead of automatically performing frequency response equalization tuning based on a stored set of calculated equalization tuning gains, the analyzing unit 16 of Op De Beek is constructed to apply a Fourier transform to a pair of previously digitized input signals representing the signal applied to a speaker and a signal output by the microphone, and compute a transfer function (and, optionally, a coherence function) between the two signals, thereby achieving better equalization with less distortion.

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The process performed by the analyzer of Op De Beek does not calculate equalization gains by matching an actual speaker output and an ideal frequency response value, but rather computes transfer and coherence functions between speaker and loudspeaker signals, so as to provide automatic adjustment of speaker output relative to microphone input based on the characteristics of the space in which the sound originates. This real time adjustment of loudspeaker output based on microphone input is useful for hearing aids. However, it has nothing to do with the claimed equalization of speaker inputs to match an ideal frequency response based on stored equalization gains, which is useful for ensuring decent sound from device speakers to compensate for speaker tolerances.

The process of the invention provides a fixed, one time, tuning of each speaker by adjusting the equalization based on an ideal frequency response for the type of speaker in question. In contrast, Op De Beek provides constant adjustment of equalization values based on a microphone input. Since Op De Beek seeks to adjust equalization based on the acoustic environment in which the speaker (a hearing aid) is being used, there is no need to perform matching to an ideal curve, calculation of a single set of gains, and storage of the gains, as claimed. Op De Beek varies the gains as necessary to achieve a desired transfer function, whereas the claimed invention seeks to maintain a fixed, consistent (“ideal”) speaker frequency response. These are opposite functions.

Because the Op De Beek patent fails to disclose or suggest matching of speaker characteristics to an ideal, storage of the calculated gains, and maintaining the optimum matched speaker output by using the stored gains (as opposed to adjustment of speaker output based on a continuously calculated transfer function between a speaker and microphone), it is respectfully submitted that the Op De Beek patent neither anticipates nor suggests the presently claimed invention, and withdrawal of the rejections under 35 USC §§102(b) and 103(a) is respectfully requested.

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Having thus overcome each of the rejections made in the Official Action, withdrawal of the rejections and expedited passage of the application to issue is requested.

Respectfully submitted,

BACON & THOMAS, PLLC

A handwritten signature in black ink, appearing to read 'B. E. Urcia', followed by a long horizontal line extending to the right.

By: BENJAMIN E. URCIA
Registration No. 33,805

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BACON & THOMAS, PLLC
625 Slaters Lane, 4th Floor
Alexandria, Virginia 22314

Telephone: (703) 683-0500

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